Master Program in Computer Science and Networking

High Performance Computing

2012-13

Homework 5

Submit the written answer. Deadline: lecture of November 19, or send an *e*-mail. The work has to be discussed at Question Time.

The answer must be properly and clearly explained.

Question

This exercise has to be used in order to verify the student preparation on firmware, assembler and memory hierarchies.

Evaluate the completion time of a program that computes the integer matrix-vector product of A[M][M] and B[M] with result in C[M]. Specifications:

- M = 16K;
- D-RISC machine with elementary processor architecture, clock cycle τ;
- Primary cache on-demand, associative, capacity 32K words, block size of 8 words;
- Main memory with interleaved organization, 8 modules, clock cycle equal to 40τ;
- Inter-chip transmission latency equal to 5τ.

In a first version, neglect the cache writing strategy, or assume the write-through strategy.

Insert a secondary cache on-chip and re-evaluate the completion time.